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## PATENT ABSTRACTS OF JAPAN

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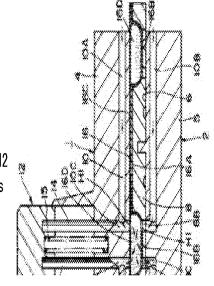
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## (54) INHALATION TYPE MEDICINE ADMINISTERING TOOL

## (57)Abstract:

PROBLEM TO BE SOLVED: To administer a specified amount of medicinal powder stored in a medicinal powder storing part to a patient by diffusing and atomizing the medicinal powder in the medicinal powder storing part of a blister pack.

SOLUTION: A constitution wherein a perforating tool 12 with two pins 14 and 14 for perforation is provided on a body 2 and a blister pack is perforated by means of the perforating tool 12 is provided. Therefore, as inlet holes H1 communicating with inlet side ventilating passages 10 and outlet holes H2 communicating with outlet side ventilating passages 11 can be made on the blister pack 16 by means of the pins 14 and 14 of the perforating tool 12, turbulence is generated in the medicinal powder storing part 16D by air flow flowing from the inlet holes H1 toward the outlet holes H2 and the medicinal powder in the medicine powder storing part 16D can be diffused and atomized by this



hereby certify that to the best of my knowledge and belief the fully conversant with the English and Japanese languages, do Corporation of 1-29, Akashi-cho, Chuo-ku, Tokyo 104-0044, Japan, Ichikawa-shi, Chiba 272-0123, Japan, and working for ISP day of December, 1999 in respect of an application for Letters following is a true translation of Japanese Patent Application 11-352281 filed in the Japanese Patent Office on the 10th Satoru Kakeno, residing at 1-2, Saiwai 2-chome,

Signed, this 2nd day of June, 2006

Satoru Kakeno

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[DOCUMENT NAME] SPECIFICATION

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[Title of the Invention] INHALANT MEDICATOR

[Claim 1] An inhalant medicator comprising:

end for inhalation of medical powder; one axial end and an inhalant port at the other axial a medicator body including a holder mounting portion

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apart from each other in a circumferential direction a plurality of medical powder storage chambers spaced mounting portion and holding thereon a blister pack having a holder detachably rotatably mounted to the holder

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air passage to supply atmosphere the medicator body having a portion defining an inflow toward one of the

plurality of medical powder storage chambers of holder mounting portion; blister pack held on the holder which is mounted on the

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held on the holder toward the inhalant port; and one medical powder storage chamber of the blister air passage to flow out the medical powder stored in the the medicator body having a portion defining an outflow pack

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powder storage chamber of the blister pack, so that the inflow hole is fluidly communicated with the inflow air passageway and the outflow hole is fluidly communicated with the inflow hole and an outflow hole in the one medical a pricking tool attached to the medicator body to prick outflow air passageway.

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between the holder mounting portion of the medicator body which further comprises a positioning means provided The inhalant medicator as claimed in claim

storage chamber of the blister pack held on the and a pricking position of the pricking tool. けばる holder, for positioning the one medical powder holder

medicator-body portions are formed body comprises upper and lower medicator-body portions  $1\, ext{or}\,2$  , wherein the holder mounting portion of the medicator other, and the upper and lower medicator-body portions and a joining portion through which the upper and lower define therebetween a holder mounting groove which opens inserted into and removed from within the holder mounting disc-shaped holder so [Claim 3] three directions, and the holder The inhalant medicator as claimed in claims that the disc-shaped holder integral comprises with

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20 15 25 medicator body has a protruded portion that is a center upside of the holder and is fitted to one of the plurality protruded portion to the center of rotation of the holder of medical powder storage chambers of [Detailed Description [1000] [Claim 4] recessed fit portions each of which is formed on an rotation of the holder, and the holder has a plurality 2, or formed on an underside the holder has a portion defining a guide groove that W wherein the holder mounting portion of The inhalant medicator as claimed in claims of the of the holder Invention] the blister pack, to guide

[Field of the Invention]

medicator suitable to prescribe The present invention relates granular t O Ħ 0 inhalant powdered

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breathing action of the medicines toward within patient. lungs of ø patient by way 0

[0002]

[Prior Art]

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atmosphere via the capsule housing chamber, and a pricking accommodated in the capsule housing chamber. tool provided for passageway communicating the inhalant port with equipped at the other axial end with an inhalant including a capsule housing chamber at one axial end and [0003] through which the medical powder is inhaled, an inhaled, inhalant medicator used for an inhalation treatment where dose of medical powder encapsulated in a capsule Of these medications for an asthmatic patient, an is generally constructed by a medicator body pricking holes in the capsule the air port

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Patent Provisional Publication Nos. 59-88158 and Such inhalant medicators have been disclosed in Japanese circumferential direction, for inhalant medication. set of blisters or a plurality of blistered medical powder inhalant medicators utilizing a blister pack having a 62 - 41668.storage chambers spaced apart There have been proposed and developed various from each other in the

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25 [0004]

holder is configured to be rotatably mounted on a medicator pack holder, which holds a blister pack. The prior art inhalant medicator includes a blister The blister pack

[0005]

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storage chamber to be carried via the inhalant port into mouth, air flow directed from the pricked holes through Under these conditions, when the patient a single plunger having a needle-shaped pricking tip. position (prescribing position) are pricked by means of port via the internal space of the medical powder storage intercommunicate the atmospheric side and the inhalant within lungs of the patient, holes enables medical powder stored in the medical powder storage chamber into the inhalant port her breath while taking of the patient. order the blister prescribe the medical powder pack installed at the inhalant port in his or her the medical needed the pricking draws powder toward

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lungs

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medical powder by rotation of medication procedures are made. is set at the pricking position. medical powder storage chamber of the same blister pack consecutively dose a patient with a specified amount of manner together with the blister pack holder, and then the next without blister In order to continuously perform inhalant medication, described exchanging pack previously, a 'n. ø rotated by a capsule the series of inhalant Thereafter, in the same Thus, it is possible predetermined angle blister pack holder

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[7000]

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[Task solved by the Invention]

powder inhalant medicators, in order to prick holes in the medical However, in the previously described storage chamber 0 H the blister pack, prior þ single

the medical powder storage chamber from one of the two medical powder storage chamber flows straight through plunger is used as the pricking tool. pricked holes are pricked or pierced in the medical powder storage straightly penetrating the medical powder storage chamber, of the blister pack. Air introduced to the other. Thus, two holes, **into** 

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medicines. lowering medical benefits of powdered or granular may be undesirably left in the medical powder storage a specified amount of medical powder into the lungs, thus way of such straight airflow and thus some medical powder medical powder in the medical powder storage chamber by Therefore, it is impossible to adequately diffuse As a result of this, the patient cannot inhale

[6000

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Ŋ 0 25 in a medical powder storage chamber amount of medical powder toward within lungs of a patient, medicator, which is capable of prescribing a specified while satisfactorily diffusing the medical powder stored accordingly an object thereof is to provide an inhalant aforementioned disadvantages of the prior art, and [010] The present invention has been made to solve the of a blister pack.

[Means to solve the Task]

mounting portion at one axial in claim 1 comprises a medicator body including a holder of the present invention, an inhalant medicator as recited In order to accomplish the aforementioned objects end and an inhalant

20 mounting portion and holding thereon a blister pack having a p apart from each other in a circumferential direction medicator body to prick an inflow hole and an outflow a portion defining an outflow air passage to flow out outflow hole is fluidly communicated with the outflow communicated with the inflow air passageway and the blister pack, so hole in the one medical powder chamber of the the medical powder stored in the one medical powder storage the thereof, air passageway. plurality of medical powder storage chambers holder the other axial end for inhalation of medical powder inflow air passage to supply atmosphere toward one the plurality of medical powder storage blister pack held on the holder which is mounted on holder mounting portion, the medicator body having inhalant port, the medicator body having a portion defining detachably rotatably mounted to the holder blister pack held on the holder that and a pricking tool attached to the the inflow storage hole is fluidly chamber chambers spaced toward 0 Hi the

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[1100]

on the holder-mounting portion of holds the blister pack in place. communicated with the outflow air passageway are pricked with the inflow air passageway and an outflow hole fluidly of the pricking tool, an inflow hole fluidly communicated to the pricking position of the pricking tool. With the previously noted arrangement, the holder one of the blister back is mounted on and attached the plurality of medical powder The holder is mounted the medicator body. storage By means

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passageway via the inhalant port into lungs of the patient. carried through the inflow hole, the outflow air hole into the medical powder storage chamber, and thus flows through the inflow air passageway and the inflow taking the inhalant port in his or her mouth, conditions, when the patient draws his or her breath while in the one medical powder storage chamber. Under medical power/air mixture containing medical powder is atmosphere

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effectively diffuse or micronize medical powder the medical powder storage chamber into the inhalant port. efficiently feed almost all of medical powder stored in in the medical powder storage chamber by virtue storage chamber. Turbulent flow is thus produced within the medical powder turbulent flow. flowing via the inflow hole toward the outflow hole is inner wall of the medical powder storage chamber. directed straight, but brought into collision with During inhaling operation of medical powder, air As a result of this, it is possible Therefore, it is possible to of the stored to

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of the blister pack held on the holder at a pricking position for positioning one of the medical powder storage chambers mounting portion of the medicator body and the holder, a positioning means is further provided between the holder the pricking tool. According to the invention as recited in claim 2,

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conditioned in the blister pack holding state, With the previously-noted arrangement, the holder, is attached

positioned at the pricking position of the pricking tool, body, the positioning means stops rotary motion of When rotating the holder with respect to the medicator so as to position the medical power storage chamber at holder when the one medical power storage the pricking position. the holder mounting portion of the medicator body. chamber

[5100]

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inserted into and removed from within the holder mounting define therebetween a holder mounting groove which opens other, and the upper and lower medicator-body portions medicator-body portions a joining portion through which the upper comprises upper and lower medicator-body portions and disc-shaped holder to three directions, and the holder comprises holder mounting portion of the medicator body According to the invention as recited in claim 3, 0 that are the formed integral with each disc-shaped holder and lower ħ.

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20 [0016]

groove, thus reducing the number of component parts. disc-shaped blister pack holder into the holder mounting possible to easily form the holder mounting portion only easily construct the inhalant medicator by inserting the and lower medicator-body portions. by forming the holder mounting groove between the upper With the previously-noted arrangement, it is H is possible

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the holder According to mounting portion the invention as Ó the medicator recited in body has claim 4,

portions each of which is formed on an upside of the holder holder, and the holder has a plurality of recessed fit a protruded portion that is a center of rotation of the underside of storage chambers of the blister pack, and the holder has and is fitted to one of the plurality of medical powder to the center of portion defining a guide groove that is formed on an the holder to guide the protruded portion rotation of the holder.

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[8100]

7 80 10 2 is fitted to the protruded portion, with the result that mounting groove under a condition where the guide groove mounting groove and the holder is inserted into the holder holder is engaged with the protruded portion of thus allowing the blister pack 16 to integrally rotate possible to integrally position the blister pack with the guide groove permits the protruded portion to be easily the holder to the holder mounting portion of the medicator storage chambers to the respective recessed fit portions, the upside of the holder and by fitting the medical power respect to the holder by installing the blister pack on together with the holder 8. With the previously-noted arrangement, it the guide groove 0 the rotation center formed Additionally, in attaching on the underside of the holder holder of the

[6100]

Figs. [0020] Hereinafter ۲ [Description of the Preferred Embodiments] to 11 is the embodiment of the invention. described in detail with reference

constructed by a medicator body 2 inhalant port Reference sign 1 The inhalant medicator assembly 1 7 (described later). denotes an inhalant medicator (described later) and is mainly

IJ [0021]

40 75 20 medicator-body portions assembly 1. As shown in Figs. 3 and 4, the medicator body portion 3 medicator-body portion portion 4 extending axially from the joining portion 2 is constructed by integrally connecting upper and lower medicator-body portions 4 and 5. mounting groove 6 portion 5 body is substantially cylindrical in shape. Also, the extending axially from the joining portion 3, a holder substantially semi-circular holder mounting portion of substantially semi-circular lower medicator-body comprised of a substantially cylindrical joining Reference sign 2 denotes the medicator body including spaced apart into which an inhalant port 7 defined between the upper and lower from the underside of 4 4 and 5. **Бу** а the inhalant medicator upper medicator-body clearance space and As a whole, the medicator The medicator body is installed, the

2 5 medicator-body portion 4 is formed Buttroddns (described later) 7 þ is screwed. pricking a support tool On the other hand, portion 13 guide 4A capable of slidably 0 Hi on the outer periphery Ø pricking tool the npper

an internal thread portion 3A into which the inhalant joining portion 3 is formed on its inner periphery with

[0022]

aperture defined between the ceiling wall surface 6B and portion 4, and the bottom surface 6C corresponding to corresponding to the underside of upper medicator-body of the joining portion 3, the ceiling wall surface namely a groove innermost end surface formed in medicator body 2. periphery of a blister pack holder 8. circular-arc shape that fits one axial direction of the medicator body. directions, the holder mounting groove 6 is formed to open to three the upside of lower medicator-body portion 5. than the thickness dimension of the holder the bottom surface 6C is dimensioned to be somewhat greater [0023 surface defined in Reference sign 6 denotes a holder mounting groove 6A of the groove that is, leftwards and rightwards, and in the medicator body by The holder mounting the contour of the outer is formed into a concave Additionally, 6A forming part three surfaces, The innermost And thus, groove

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1) 1) 20 6D extending upwards from a substantially central portion portion 6D is engaged with a guide groove 8E (described of rotation of the blister pack holder 8. The central protruded portion 6D functions as a center later). the bottom surface The medicator body is formed with a protruded portion 6C of holder mounting groove 6. The protruded

[0024]

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an external The inhalant port 7 is formed on its outer periphery with installed on the joining portion 3 of medicator body 2. Reference sign 7 denotes an inhalant port screw portion 7A. The top end of inhalant that

action by increasing a quantity of air flowing passageways 7B serves to avoid the difficulty in breathing air passageways are shown in the drawing for the purpose port diametrically small-sized. port breathing action through inhalant port 7. auxiliary air passageways 7B, 7B, ... (only two auxiliary portion 3A of joining portion inhalant port external ٦. illustrative simplicity). 1 installed on the medicator 7 is formed with a plurality of radially-extending ß h. thread portion 7A into configured in a 7 of the inhalant manner so as to gradually The root portion of inhalant Each of the auxiliary air ω body by screwing medicator the internal Inhalant port during thread into the

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20 15 groove 6 of medicator body 2. ガガた The holder 8 is formed on its upside with eight recessed detachably apart portions 8A, Reference sign 8 denotes the holder from each other by 45 degrees and located near its 7, the holder rotatably mounted into the holder In the shown embodiment, eight recessed 8A, 8 has . a substantially disc shape. 8A circumferentially spaced As clearly shown in Figs. œ that mounting

circumference.

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portions 8A

are configured or formed as

eight

25 30 8A with an inflow pin insertion hole or a radially inward respective eight recessed fit portions of the holder. radially-elongated, substantially semi-cylindrical cavities. (described later) insertion hole holder Eight blistered portions 16B of blister pack is formed in each of recessed fit 8B and an outflow pin insertion hole are integrally fitted into the portions

from each other in the radial direction of the holder radially-outward pin insertion hole 8C spaced apart

[0026]

10 IJ groove 6 toward the center of rotation of the holder 8. guide groove 8E radially extending from the center pair 8D of the eight recessed fit portions. of inflow pin insertion holes 8B and circumferentially to guide the protruded portion 6D of the holder mounting (described later) are fitted to one diametrically-opposed portions 9B included in a positioning mechanism 9 account the installation positions of pin insertion holes spaced apart from each other by 45 degrees, taking into eight recessed fit portions 8D, 8D, ..., 8D located inside rotation of the holder 8. the holder 8 and 8C. The holder 8 H is also formed on the underside with the the shown embodiment, spherical ball is also formed on its underside with The guide groove 8E is formed Furthermore,

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[0027]

25 20 groove reaches the protruded portion. mounting groove, thereon the blister pack, is inserted into the holder upside of the holder. the central protruded portion 6D under a condition where procedures. mounting groove 6 blister pack 16 is installed on and fitted to the The holder First, the guide groove 8E is engaged with œ until the innermost end of is rotatably mounted into the holder in accordance with the following Thereafter, the holder installing the guide

positioning mechanism 9 includes two spring-loaded ball in the medicator body 2. (see Fig. 5) serving as the positioning means provided 9A, sign 9 denotes a positioning mechanism 9A each closed at As shown in Figs. 4 and 5, one end,

protruded portion, and formed in the bottom surface point-symmetrical with respect to the protruded portion of each spring-loaded ball housing bore is slightly less 6D in such a manner as to sandwich therebetween the central than the inside diameter of the other portion of the bore, respective ball housing bores 9A, spring-loaded spherical balls 9B, 9B housed in the respective and two coil springs fashion so that (lowermedicator-body portion 5) of holdermounting groove to permanently bias the balls 9B, 9B in their protrusion positioning mechanism ball housing bores 9A, 9A in a manner so as the inside diameter of the opening end 90, 9C operably 9 also 9A in an unremovable includes disposed in t & 0 90

20 [0029]

directions

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balls 9B can be brought into engagement with the respective into the holder mounting groove 6, the two spring-loaded positioning mechanism 9, when the holder one of radially-elongated recessed fit portions 8A (that recessed fit portions with the rotary motion of the holder, engagement between the two spring-loaded balls and recessed fit portions BD of the holder 8. one of medical powder storage chambers 16D of blister With the þ condition where the holder 8 has previously-noted arrangement By way of the been mounted œ ۵ ۲ 0 Hi rotated the

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pricking position of the pricking tool 12, that is, pack 16) [0030] set inhalation position for inhalant medication. is efficiently positioned in a predetermined

ր Մ 10 IJ includes a lower axially-extending air passage 10B which In a end of the uppermedicator-body portion 4 to the atmosphere. portion 4, and whose one axial end opens at one axial portion 8A of the holder 8. Also, the inflow air passageway which is bored or formed in the upper medicator-body formed in the medicator body 2. The inflow air passageway introduced or directed toward within the recessed fit includes an upper axially-extending air passage 10A is provided to permit similar manner, Reference sign 10 denotes an inflow air passageway the inflow air passageway also the atmosphere outside air to

20 radially-extending pin insertion hole portion 4 toward the lower medicator-body portion 5. Pricking pin insertion hole 10C that inflow air passageway also includes a radially-extending lower medicator-body portion 5 and whose one axial end opens at one axial end of the bored or formed in the lower medicator-body portion the tool guide 4A via the upper medicator-body pin insertion hole radially extends from the formed in the medicator body so to the atmosphere. is fluidly

30 25 holder holder 8, when one of the recessed fit portions of the communicate with the inflow pin insertion hole 8B of the communicated with the other axial end of each of the upper pin insertion hole 10C is configured lower axially-extending air passages 10A and 10B. is positioned in the pricking position. to be able to

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passageway 11 includes a pin insertion hole 11A radially medical powder storage chamber 16D of the blister hole 11A, whereas the other axial end opens to the interior medicator-body portion 4 via the joining portion 3 toward extending in parallel with the pin insertion hole 11 is provided to permit medical powder stored formed in the medicator body 2. communicated with the pin insertion hole 11A, whereas air passage is fluidly communicated with the pin insertion upper outflow air passage axially extends from the upper passage 11B, inhalant port 7. the other axial end opens to the interior space axial end of the inhalant port. One axial end the inflow air passageway 10, Reference sign 11 denotes an outflow air passageway of the inhalant port 7. **£low** into the inhalant port 7. and a lower the Lower outflow air outflow air passage 11C. The outflow air passageway In a similar manner, an upper of the upper outflow passage The outflow air outflow ß h. ATPINIB 0 Hi pack

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[0032]

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insertion holes 1, the pricking tool 12 includes the support portion 13 13, and whose tips are inserted into the root portions are fixedly connected to the support portion tool guide 4A, and a pair of parallel pins 14, whose outer to prick holes in the blister pack 16. As shown in Fig. cylindrical inner peripheral wall of the pricking Reference sign 12 denotes the pricking tool used periphery 100 and is slidably supported or guided 11A. The pricking respective pin tool also 14 whose

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permanently biasing the support portion and the portion 13 and the upper medicator-body portion 4 includes a return spring 15 disposed between the support toward their initial positions. pins

[ [ [ [ [ ] ]

H1 and two outflow holes or two outflow ports H2 are pricked As a result of this, two inflow holes or two inflow ports into the respective pin insertion holes 10C and 11A. the spring 15, and thus the two pins 14, 14 are inserted 12 into the pricking tool guide 4A against the bias of After pricking, as soon as the pushing force applied to storage chambers 16D in conjunction with the lid panel. portions of the base panel define eight medical powder 10 and 11). respectively in the blistered portion 16B of a base panel 16A and a tips of When pushing the support portion 13 of pricking tool lid panel 16C of blister pins 14, 14 penetrate the blister pack 16. As detailed hereunder, pack 16 eight blistered (see Figs. Thus,

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20 13 and the two pins 14, 14 are returned back initial positions by way of the spring bias. († 0

the support portion 13 is removed, the support portion

medicator of the first embodiment. As shown in Figs. 8 blister pack 16, which is applicable to the inhalant panel 16C affixed onto the principal surface or the obverse portions having a and 9, blister pack 16 is comprised resin or On the other hand, 16B around its entire circumference, the like and having a plurality of thin-walled disc reference sign 16 denotes shape and made of of base blistered synthetic panel and the

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16A are located near the circumference of the base panel and made of synthetic resin, aluminum material or base panel 16A, and having a thin-walled disc shape and The blistered portions 16B formed in the base panel formed S eight radially-elongated, the

substantially semi-cylindrical convex portions. eight apart blistered portions are circumferentially spaced from each other by 45 degrees. The

[0035]

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10 75 medicine or powdered medicine is stored in each of the medical powder predetermined amount of medical powder, such as granular portions 16B by the lid panel 16C, medical powder storage chambers 16D are defined between the blistered portions of the base By hermetically covering or closing the blistered storage chambers panel and the lid panel 16C. Also, 160.

[0036] The inhalant medicator of the first embodiment

Hereinbelow

preliminary operation described in detail in reference to the drawings are which a patient inhales medical powder, and the flow of air and the flow of medical powder during inhalation. constructed as [0037] previously discussed. O Hi inhalant medication through the

groove faces the inhalant port 7. body under a condition in which the outermost end of guide 8, must be aligned with respect to the axis of the medicator the guide groove 8E, formed in the underside of the holder groove 6 of medicatorbody 2. During removal of the holder, First, the holder is removed from the holder mounting Then, the holder 8 can

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9 against the bias produced by the positioning mechanism be removed from the medicator body by pulling the holder

[8500]

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pack 16 can be integrally connected to and positioned blistered portions 16B (the medical powder storage on the upside of holder 8. At this time, by fitting the and the holder are rotatable together with each other. with respect to the holder 8, and thus the blister pack chambers 16D) of the blister pack 16 to the [0039] Then, blister pack 16 is fitted to and installed fit portions 8A of the holder 8, the blister respective

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holder 8, the holder 8 is mounted into the holder mounting mechanism 9 with the protruded portion, balls 9B, 9B of the positioning groove until the innermost end of the guide groove engages 8 has been completely pushed into the holder mounting holder guide groove 6. with the guide groove 8E so as to push the holder 8into port 7, and also the protruded portion 6D must be engaged end of with the axis of the medicator body so that the outermost groove 6. operations as discussed above, 8D of the holder 8 by rotating the holder 8 in an arbitrary powder is possible to accurately position one After the blister pack 16 has been installed on the the guide groove is directed toward the inhalant storage In this case, the guide groove 8E must be aligned are engaged with the recessed fit portions By way of a series of preliminary setting chambers 16D of In this manner, after the holder as shown in Fig. 9, blister pack 16 of the medical a t

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predetermined pricking position position O Hi medical powder). (the set inhalation

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20 14 15 10 Ŋ pack 16 held at the predetermined pricking position, the 16C by means of the other pin 14 inserted into pricked in the blistered portion 16B and in the lid panel pin insertion hole, and at the same time two opposed outflow 16C by means of one of the two pins 14 inserted into pricked in the blistered portion 16B and in the lid panel support portion 13 of pricking tool of a patient. of inhalant medication made by virtue of breathing action and also communicated through the outflow holes H2 with insertion hole. depressed. the outflow air passageway 11. chamber 16D inflow holes H1 with the inflow air passageway 10, Hereunder described in detail is the actual operation H1 communicating inflow air passageway 10 communicating outflow air passageway 11 are As shown in Figs. 10 and 11, two opposed inflow of blister pack 16 is communicated through First, in order to prick holes in the blister As a result, the medical powder storage ր 2 is pushed 944 are pin

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medical powder storage chamber 16D. or her mouth, air passes through the inflow air passageway the inner wall surface of medical powder storage chamber powder storage chamber 16D is brought into collision with air flow introduced via the inflow holes H1 into the medical her breath while taking the inhalant port Via Under these conditions, when the patient draws his the two inflow holes H1 and then flows At this time, into 7 į

into lungs with the aid of medical powder via his or her oral action, the turbulent flow. [0042] chamber 16D through the outflow holes H2 and the outflow almost all of the medical powder pre-stored in the storage As a consequence, it is possible to effectively flow out in the chamber can be effectively diffused or micronized. powder storage chamber. H2 are spaced apart from each other in the axial direction, 16D, because the inflow holes H1 and the outflow holes thereby resulting in turbulent flow within the medical passageway 11 into the inhalant port 7 by virtue of the patient can inhale a specified amount of As discussed above, during breathing Thus, the medical powder stored the turbulent cavity and trachea FLOW.

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25 о И 15 the next blister pack total can be continuously made. operation, it is possible to continuously inhale medical portions the previously-noted pricking operation and inhaling 9B of the positioning mechanism 9. The adjacent, rotated from the current angular position by 45 degrees. inhalant medication is needed, be completed. is removed In this manner, Ħ 8D of holder are inhalation medication. this manner, eight inhalant medications **4** from the medicator body, and then the old next diametrically-opposed recessed fit Subsequently to the above, when the second is replaced with a new blister pack for the first inhalant medication can thus engaged with the balls the holder 8 Thereafter, the holder After this, through is first

0043]

powderstoragechamber. by virtue of the turbulent flow occurring in the medical powder stored in the medical powder storage storage chamber to two outflow holes. is not directed straight, but brought into collision with air flowing via the inflow holes toward the outflow holes holes H2 communicating the outflow air passageway 11 can communicating the inflow air passageway 10 and the outflow medicator of enhancing the reliability of enhances medical benefits of the medical powder, medical powder pre-stored in one of storage chambers 16D possible to inflow holes via storage Turbulent flow is thus produced within the medical powder the inner wall of the medical powder storage chamber H2 are spaced apart from each other. 12. two pins 14, [0044] formed or pricked in the blister pack 16 by means efficiently reliably prescribe a specified amount of so that chamber SOCI of a patient by way of breathing action. effectively diffuse or micronize medical the inflow holes H1 and the outflow holes forth above, 14 the fixedly connected to the pricking tool the internal space of the medical powder 16D by the air flow directed first embodiment, the inflow holes As a result of this, it is possible according the inhalant medicator. As a result of this, († 0 Therefore, it is the inhalant chamber from thereby

positioning mechanism 9 is provided in the holder mounting with the recessed fit portions 8D, and additionally the chamber Furthermore, Q 16D for positioning the medical powder 0 Hi blister the holder 8 is formed on its underside pack 16 at the predetermined storage

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chamber 16D of blister pack 16 at the predetermined ensuring easy handling of the inhalant medicator accurately prick holes pricking position. In other words, the recessed fit portions 8D. Thus, it medication) of pricking tool 12 by fitting the balls pricking position (the set position for inhalant [0045] accurately position the medical powder storage į the blistered portion, it is possible is possible

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20 15 10 assembly, and also reduces total production costs of the in structure, thus reducing the number of parts of the easily assembled by mounting the disc-shaped blister pack by not only upper and lower medicator-body portions inhalant medicator holder 8 into the holder mounting groove 6 being simple inhalant medicator of the embodiment is designed to be holder mounting inhalant upper and lower upper and lower the first embodiment, the medicator body 2 is constructed ហ Moreover, but also medicator assembly. in the inhalant medicator assembly 1 of groove 6 is simply defined between medicator-body portions 4 and 5. medicator-body portions, and also joining portion 3 This interconnecting the ensures ease 0 f

2 Additionally, the holder 8 is formed on its upside

with circumferentially equally spaced,

it is possible to accurately easily position the blister radially-elongatedeight recessed fit portions 8A. pack 16 on the holder 8 by fitting the blistered portions the respective recessed fit portions

with the holder allowing the blister pack 16 to integrally rotate together [0047] 8. This ensures ease of handling

of the medicator body 2, thus ensuring ease of handling. and easy mounting of the holder 8 on the desired position rotation center of the holder 8. protruded portion 6D to be reliably easily guided to the mounting groove 6. The guide groove engageable with the protruded portion 6D of holder [0048] its underside with the guide groove 8E, which is In addition đ the above, the holder This ensures accurate **8** permits 8 1: 8 formed

be used in the inhalant medication. described herein. In lieu thereof, a blister pack having is not limited to the particular embodiments shown and circumferentially spaced from each other, the invention eight medical powder blister pack 16 having eight blistered portions 16B although the inhalant medicator is exemplified in the number of the recessed fit portions 8A of the holder **blister** two or more and seven or [0049] identical to the number number number H pack having nine or more blistered portions the 0 Off embodiment shown and described herein, the pin insertion hole pairs 8B, 8C, recessed fit storage less of the blistered portions. portions 8D must chambers blistered In this case, 16D) portions, or a be set and

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[Effects of the Invention]

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9 recited in claim 1, an inhalant medicator comprises As explained previously, according to the invention

IJ with the outflow air passageway. passageway and the outflow hole is fluidly communicated inflow hole is fluidly communicated with the inflow air powder storage chamber of the blister pack, so that prick an inflow hole and an outflow hole in the one medical blister pack held on the holder toward the inhalant port, passage to supply atmosphere toward one of the plurality stored in the one medical powder storage chamber of the an outflow air passage to flow out portion, the medicator body having a portion defining held on the holder which is mounted on the holder mounting of medical powder storage chambers of the blister pack medicator body having a portion defining an inflow air medical powder storage chambers spaced apart from each holding thereon a blister pack having a plurality of rotatably mounted end for inhalation of medical powder, a holder detachably one axial end and an inhalant port a medicator body including a holder mounting portion at Ø pricking tool attached to the medicator in a circumferential direction thereof, to the holder mounting portion and the medical at the other axial Apod

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3 25 passageway and outflow holes fluidly communicating with inflow holes fluidly communicating with the inflow air on the holder mounting portion of the medicator body. to the pricking portion of the pricking tool, chambers of the blister pack is mounted on and attached Then, one of the plurality of medical power storage the holder, holding the blister pack in place, is mounted Therefore, with the previously-noted arrangement, and thus

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mixture containing medical powder is carried through the patient draws his or her breath while taking the inhalant powder storage chamber. the outflow air passageway can be pricked in the one medical port into lungs of the patient. powder inflow air passageway and the inflow hole into the medical inflow hole, the outflow air passageway via the inhalant in his or her mouth, atmosphere flows storage chamber, and thus medical powder/air Under these conditions, when the through

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10 [0051]

Turbulent flow is thus produced within the medical powder not directed straight, but brought into collision with almost all of medical powder into the inhalant port. effectively diffuse or micronize medical powder stored storage chamber. flowing via the inflow hole toward the outflow hole medical benefits of the medical powder, thereby enhancing of a patient by way of breathing action. in one of the medical powder storage chambers into lungs prescribe a specified amount of medical powder pre-stored a result of this, it is possible to efficiently reliably turbulent flow. inner wall of the medical powder storage chamber. reliability During inhaling operation of medical powder, medical powder storage chamber by virtue Thus, it is possible to effectively feed 0 Hi Therefore, it is possible the inhalant medicator This

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[0052]

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mounting portion of the medicator body and the holder, positioning means is further provided between the holder According to the invention as recite in claim

action and ease of handling. positioning means. storage chamber at the pricking position by means of the possible to accurately easily position the medical power mounting portion of the medicator body. When rotating of the pricking tool. Thus, the holder, conditioned in the blister pack holding state, is attached to the holder of the blister pack held on the holder at a pricking position for positioning the one medical powder storage chamber holder with respect to the medicator body, it This ensures the accurate pricking

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15 medicator-body portions are formed integral with each define therebetween a holder mounting groove which opens other, and the upper and lower medicator-body portions to three comprises upper and lower medicator-body portions and the holder mounting portion of the medicator body joining portion through which the upper According to the invention as recited in directions, and the holder comprises and lower ω,

ŝ 20 the holder mounting groove, thus reducing the number of by inserting the It is possible to easily construct the inhalant medicator groove between the upper and lower medicator-body portions mounting portion only by forming the holder mounting inserted into and removed from within the holder mounting disc-shaped holder so that the disc-shaped holder Thus, it is possible to easily form the holder disc-shaped blister pack holder

reduced costs.

component parts.

This ensures the ease of assembling and

holder, and the holder has a plurality of recessed fit underside of the holder to guide the protruded portion storage chambers of the blister pack, and the holder has and is fitted to one of the plurality of medical powder portions each of which is formed on an upside of the holder a protruded portion that is a center of rotation of the holder mounting portion of the medicator body has possible to integrally position the blister pack with portion of holder mounting groove and the holder attaching the holder and enhancing the ease of handling. Additionally, holder and the blister pack to integrally rotate together, together with the holder 8, thus allowing the blister pack 16 to integrally rotate storage chambers to the respective recessed fit portions, the upside of the holder and by fitting the medical power respect to the holder by installing the blister pack on portion to be accurately easily guided to the rotation where the guide groove is fitted to the protruded portion, inserted into the holder mounting groove under a condition underside of the medicator body, the guide groove with the portion defining a guide groove that the center of rotation of the holder. Thus, it is According to the invention as recited in claim result that the guide groove permits the protruded the holder is engaged with the protruded to the holder mounting portion thus enabling both of formed is formed on an on the the j.

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[Figure 1]

center of the holder.

[Brief

Description of the Drawings]

This enhances the ease of handling.

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illustrating one embodiment of an inhalant medicator of the invention. FIG. 1 is a longitudinal cross-sectional view

[Figure 2]

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medicator of the embodiment, made according to invention. FIG. 2 is a plan view illustrating the inhalant the

[Figure 3]

10 inhalant medicator shown in Fig. 1. illustrating details of only a medicator body of the FIG. 3 is a longitudinal cross-sectional view

[Figure 4]

in Fig. the medicator body, taken along the line IV - IV shown FIG. 4 is a longitudinal cross-sectional view of

[Figure 5]

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along the line V - V of Fig. 1. medicator body and a positioning mechanism, taken FIG. 5 is a lateral cross-sectional viewillustrating

[Figure 6]

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pack holder. 6 is a plan view illustrating only a blister

[Figure 7]

FIG. 7 is a bottom view illustrating only the blister

[Figure 8]

holder.

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pack

as viewed from FIG. 8 is a perspective view of only a blister pack, its bottom side.

[Figure 9]

medicator body. blister pack is held on the holder and then the holder illustrating the inhalant medicator in a state where the is mounted in a FIG. 9 ۷. ۲۰ Ø holder mounting groove formed in the longitudinal cross-sectional view

[Figure 10]

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pack medical powder stored in the storage chamber of the blister illustrating the inhalant medicator is inhaled. FIG. 10 is a longitudinal cross-sectional e at state where View

[Figure 11]

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flow in the medical powder storage chamber of the blister cross-sectional view showing airflow and medical powder FIG. 11 is a partly enlarged longitudinal

[Description of Reference Signs]

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pack.

- 1 Inhalant Medicator Assembly
- 2 Medicator Body (Holder Mounting Portion)
  4 Upper Medicator-body Portion
- 5 Lower Medicator-body Portion

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- 6 Holder Mounting Groove
- 6D Protruded Portion
- Inhalant Port
- 8 Holder
- 25 8A Recessed Fit Portion
- 8E Guide Groove
- 9 Positioning Mechanism (Positioning Means)
- 10 Inflow Air Passageway
- 11 Outflow Air Passageway
- 12 Pricking Tool

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Medical Powder Storage Chamber Blister Pack

Pin

Inflow Hole

Outflow Hole

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[DOCUMENT NAME]

ABSTRACT

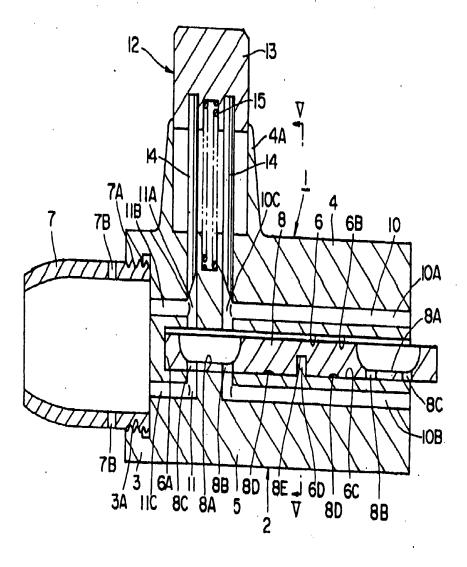
[Abstract]

of medical powder, stored in a medical powder storage chamber of a blister pack, toward within lungs of a patient, [Object] It is an object to prescribe a specified amount

Ų١ in the medical powder storage chamber. while satisfactorily diffusing the medical powder stored

10 0 15 piercing pins 14, storage chamber 16D can be diffused and micronized, hole H1 to the outflow hole H2. By virtue of the turbulent by way of airflow flowing and directed from the inflow can be created in the medical powder storage chamber 16D the pins 14, 14 of the pricking tool 12. Turbulent flow passageway 11 can be formed in the blister pack 16 by and an outflow hole H2 communicating with an outflow air hole H1 communicating with an inflow air passageway pack 16 by means of the pricking tool 12. the medical powder storage chamber 16D can be prescribed flow, the medical powder stored in the medical powder [Means to solve] toward within lungs The inhalant medicator is configured to prick a blister specified amount of medical powder stored in 14 is installed on a medicator A pricking tool 12 equipped with two of a patient. Thus, an inflow Apod 10

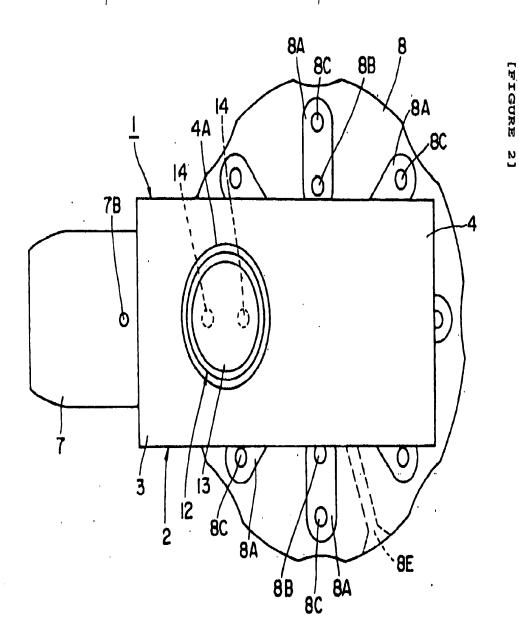
[Selected Drawing] Figure



[DOCUMENT NAME] DRAWING
[FIGURE 1]

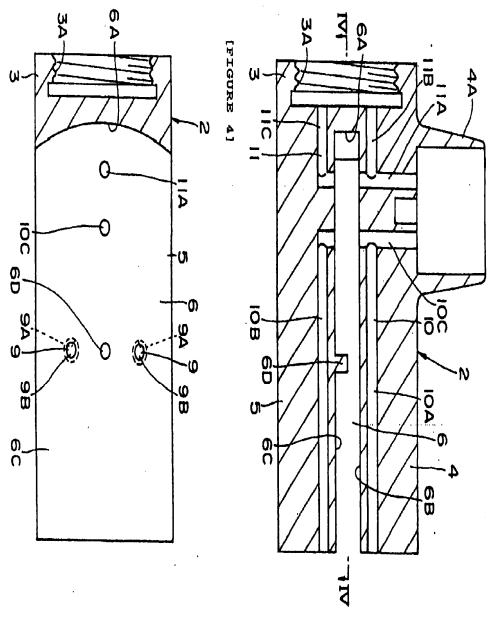
整理番号=T3580

提出日 平成11年12月10日 特顯平11-352281 <u>賈: 1/ 10</u>



提出日 平成11年12月10日 特願平11-352281 頁: 2/ 10

整理番号=T3580



提出日 特顏平11-352281 平成11年12月10日 頁: 3/10

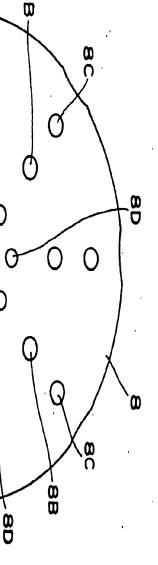
[FIGURE 3]

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[FIGURE 6]

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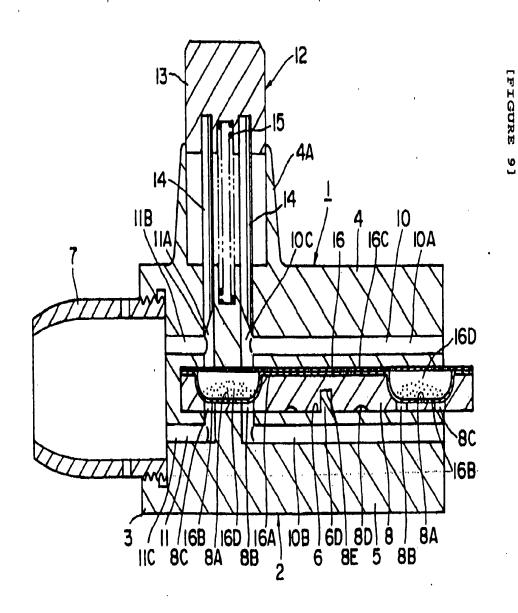


8D-88 88 80 FI 0 0 0 80 0 90 88

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[FIGURE 8]

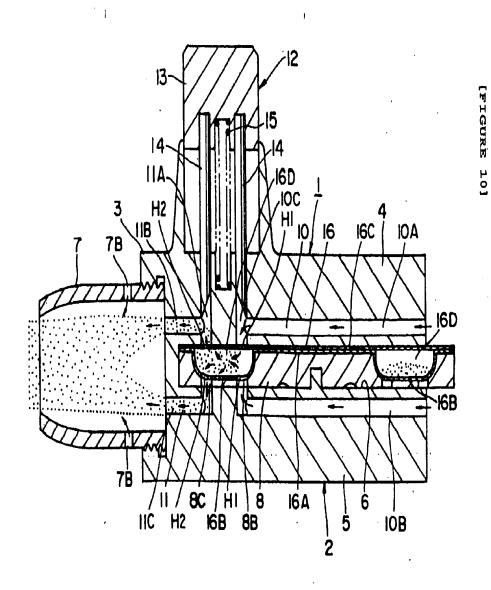
IGB IGC IG



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[FIGURE 11]

